E 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648- XB006]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Marine Site Characterization Surveys off of Massachusetts and Rhode Island

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; proposed incidental harassment authorization; request for comments on proposed authorization and possible Renewal.

SUMMARY: NMFS has received a request from Vineyard Wind 1, LLC (Vineyard Wind 1) for authorization to take marine mammals incidental to marine site characterization surveys off of Massachusetts and Rhode Island. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to incidentally take marine mammals during the specified activities. NMFS is also requesting comments on a possible one-time, one-year renewal that could be issued under certain circumstances and if all requirements are met, as described in **Request for Public Comments** at the end of this notice. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorizations and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than [*insert date 30 days after date of publication in the FEDERAL REGISTER*].

ADDRESSES: Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service. Written comments should be submitted via email to *ITP.Davis@noaa.gov*.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments, including all attachments, must not exceed a 25-megabyte file size. All comments received are a part of the public record and will generally be posted online at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable* without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Leah Davis, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable.* In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the "take" of marine mammals, with certain exceptions. sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is

limited to harassment, a notice of a proposed incidental take authorization may be provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as "mitigation"); and requirements pertaining to the mitigation, monitoring and reporting of the takings are set forth.

The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (*i.e.*, the issuance of an IHA) with respect to potential impacts on the human environment. This action is consistent with categories of activities identified in Categorical Exclusion B4 (IHAs with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review.

We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on the IHA request.

Summary of Request

On January 29, 2021, NMFS received a request from Vineyard Wind 1 for an IHA to take marine mammals incidental to marine site characterization surveys off of Massachusetts and Rhode Island for the 501 North wind energy project. The application was deemed adequate and complete on May 19, 2021. Vineyard Wind 1's request is for take of a small number of 14 species of marine mammals by Level B harassment only. Neither Vineyard Wind 1 nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

NMFS previously issued an IHA to Vineyard Wind LLC (Vineyard Wind) for similar marine site characterization surveys (85 FR 42357; July 14, 2020), and NMFS has received a request from Vineyard Wind for a renewal of that IHA.

Since issuance of Vineyard Wind's previous IHA (85 FR 42357; July 14, 2020), Vineyard Wind has split into separate corporate entities, Vineyard Wind (to which the previous IHA was issued), and Vineyard Wind 1, which holds assets associated with the 501 North wind energy project. Therefore, although the surveys analyzed in this proposed IHA to Vineyard Wind 1 would occur in an area that overlaps with a portion of the project area included in the previous Vineyard Wind IHA (and potentially a renewal, if appropriate), this proposed IHA would be issued to a separate corporate entity (Vineyard Wind 1).

Description of Proposed Activity

Overview

As part of its overall marine site characterization survey operations, Vineyard Wind 1 proposes to conduct high-resolution geophysical (HRG) surveys in the Lease

Area and along the Offshore Export Cable Corridor (OECC) off of Massachusetts and Rhode Island.

The purpose of the marine site characterization surveys is to obtain a baseline assessment of seabed/sub-surface soil conditions in the Lease Area and cable route corridors to support the siting of potential future offshore wind projects. Underwater sound resulting from Vineyard Wind 1's proposed site characterization survey activities, specifically HRG surveys, has the potential to result in incidental take of marine mammals in the form of behavioral harassment.

Dates and Duration

The total duration of HRG survey activities would be approximately 170 survey days. Each day that a survey vessel is operating counts as a single survey day, *e.g.*, two survey vessels operating on the same day count as two survey days. This schedule is based on assumed 24-hour operations. Vineyard Wind 1 proposes to begin survey activities in summer 2021, upon receipt of an IHA, and continue for up to one year (though the actual duration will likely be shorter, particularly given the use of multiple vessels). The IHA would be effective for one year from the date of issuance.

Specific Geographic Region

Vineyard Wind 1's proposed survey activities would occur in the Lease Area, located approximately 24 kilometers (km) (13 nautical miles (nmi)) from the southeast corner of Martha's Vineyard, and along the OECC route (landfall) in both Federal and State waters of Massachusetts (see Figure 1). The OECC routes will extend from the lease areas to shallow water areas near potential landfall locations. Water depths in the Lease Area range from about 35 to 60 meters (m) (115 to 197 feet (ft)). Water depths along the potential OECC route range from 2.5 to approximately 35 m (8 to approximately 115 ft). For the purpose of this IHA, the Lease Area and OECC are collectively referred to as the project area. The project area for this proposed IHA

overlaps with the project area for Vineyard Wind's previous IHA (85 FR 42357; July 14, 2020) for which Vineyard Wind has submitted a renewal request.

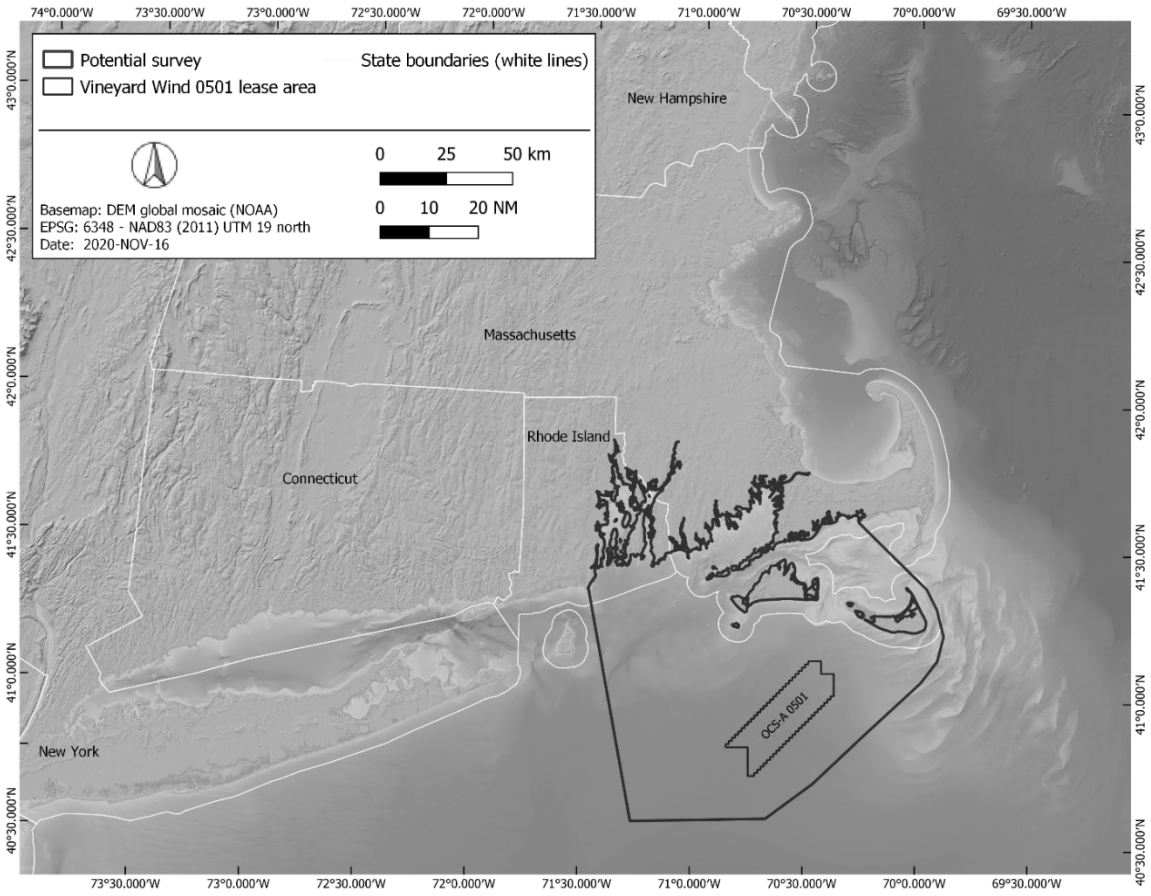

Figure 1 -- Potential Survey Area

Detailed Description of Specific Activity

Vineyard Wind 1 proposes to conduct HRG survey operations, including single and multibeam depth sounding, magnetic intensity measurements, seafloor imaging, and shallow and medium penetration sub bottom profiling. The HRG surveys may be conducted using any or all of the following equipment types: Side scan sonar, single and multibeam echosounders, magnetometers and gradiometers, parametric sub-bottom profiler (SBP), CHIRP SBP, boomers, or sparkers. HRG survey activities are anticipated to include multiple survey vessels (up to eight, depending on the season), which may

operate concurrently, though surveys will be spaced to avoid geophysical interference with one another. Vineyard Wind 1 assumes that HRG survey activities would be conducted continuously 24 hours per day, with an assumed daily survey distance of 80 km (43 nmi). Survey vessels would maintain a speed of approximately 4 knots (2.1 m/second) while surveying, which equates to 181 km per 24-hour period. However, based on past survey experience (*i.e.*, knowledge of typical daily downtime due to weather, system malfunctions, etc.), Vineyard Wind 1 assumes 80 km as the average daily distance.

Acoustic sources planned for use during HRG survey activities proposed by Vineyard Wind 1 include the following:

- Shallow Penetration Sub-bottom Profilers (SBP; Chirps) to map the near-surface stratigraphy (top 0 to 5 m (0 to 16 ft)) of sediment below seabed). A chirp system emits sonar pulses that increase in frequency from about 2 to 20 kHz over time. The pulse length frequency range can be adjusted to meet project variables. These sources are typically mounted on the hull of the vessel or from a side pole;
- Medium Penetration SBPs (Boomers and Sparkers) to map deeper subsurface stratigraphy as needed. A boomer is a broadband sound source operating in the 3.5 Hz to 10 kHz frequency range. Sparkers create acoustic pulses from 50 Hz to 4 kHz omnidirectionally from the source that can penetrate several hundred meters into the seafloor. These sources are typically towed behind the vessel.

Operation of the following survey equipment types is not reasonably expected to present risk of marine mammal take, and will not be discussed further beyond the brief summaries provided below;

- Parametric SBPs, also called sediment echosounders, for providing high data density in sub-bottom profiles that are typically required for cable routes, very shallow water, and archaeological surveys. These sources generate short, very narrow-

beam (1° to 3.5°) signals at high frequencies (generally around 85-100 kHz). The narrow beamwidth significantly reduces the potential that a marine mammal could be exposed to the signal, while the high frequency of operation means that the signal is rapidly attenuated in seawater. These sources are typically mounted on the hull of the vessel or from a side pole rather than towed behind the vessel;

- Ultra-Short Baseline (USBL) positioning systems are used to provide high accuracy ranges by measuring the time between the acoustic pulses transmitted by the vessel transceiver and the equipment transponder (or beacon) necessary to produce the acoustic profile. It is a two-component system with a hull or pole mounted transceiver and one or several transponders either on the seabed or on the equipment. USBLs are expected to produce extremely small acoustic propagation distances in their typical operating configuration;
- Single beam and Multibeam Echosounders (MBESs) to determine water depths and general bottom topography. The proposed single beam and MBES all have operating frequencies >180 kHz and are therefore outside the general hearing range of marine mammals;
- Side-scan Sonar (SSS) is used for seabed sediment classification purposes and to identify natural and man-made acoustic targets on the seafloor. The proposed SSSs all have operating frequencies >180 kHz and are therefore outside the general hearing range of marine mammals; and
- Magnetometer/Gradiometer has an operating frequency >180 kHz and is therefore outside the general hearing range of marine mammals.

Table 1 identifies the representative survey equipment with the expected potential to result in exposure of marine mammals and potentially result in take. The make and model of the listed geophysical equipment may vary depending on availability and the

final equipment choices will vary depending on the final survey design, vessel availability, and survey contractor selection.

HRG surveys are expected to use several equipment types concurrently in order to collect multiple aspects of geophysical data along one transect. Selection of equipment combinations is based on specific survey objectives.

Table 1 -- Summary of Representative HRG Equipment

System	Frequency (kHz)	Beam width (°)	Pulse duration (ms)	Repetition rate (Hz)	In-beam Source Level (dB)	
					RMS	Pk
Shallow subbottom profiler (non-impulsive)						
EdgeTech Chirp 216	2–16	65	2	3.75	178	182
Deep seismic profiler (impulsive)						
Applied Acoustics AA251 Boomer	0.2–15	180	0.8	2	205	212
GeoMarine Geo Spark 2000 (400 tip)	0.05–3	180	3.4	1	203	213

Note: While many of these sources overlap with Vineyard Wind's previous IHA (85 FR 42357; July 14, 2020), the operating parameters used as proxies in modeling some sources were changed as a result of HRG modeling recommendations from NMFS. For data source information, please see Table A-3 in Vineyard Wind 1's application.

Proposed mitigation, monitoring, and reporting measures are described in detail later in this document (see **Proposed Mitigation** and **Proposed Monitoring and Reporting**).

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SARs; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS's website (*https://www.fisheries.noaa.gov/find-species)*.

Table 2 lists all species or stocks for which take is expected and proposed to be authorized for this action, and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. For taxonomy, we follow the Committee on Taxonomy (2020). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS's SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS's stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS's U.S. Atlantic and Gulf of Mexico SARs. All values presented in Table 2 are the most recent available at the time of publication and, except for North Atlantic right whale, are available in the 2019 SARs (Hayes *et al.*, 2020) and draft 2020 SARs (available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports*). The most recent North Atlantic right whale stock abundance estimate is presented in NOAA Technical Memorandum NMFS-NE-269 (Pace 2021).

Table 2 -- Marine Mammals Likely To Occur in the Project Area That May Be Affected by Vineyard Wind 1's Proposed Activity

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, N_{min}, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenidae						
North Atlantic right whale[4]	*Eubalaena glacialis*	Western North Atlantic	E/D; Y	368 (NA; 356; 2018)	0.8	18.6
Family Balaenopteridae (rorquals)						
Humpback whale	*Megaptera novaeangliae*	Gulf of Maine	-/-; Y	1,393 (0.15; 1,375; 2016)	22	58
Fin whale	*Balaenoptera physalus*	Western North Atlantic	E/D; Y	6,802 (0.24; 5,573; 2016)	11	2.35
Sei whale	*Balaenoptera borealis*	Nova Scotia	E/D; Y	6,292 (1.02; 3,098; 2016)	6.2	1.2
Minke whale	*Balaenoptera acutorostrata*	Canadian Eastern Coastal	-/-; N	21,968 (0.31; 17,002; 2016)	170	10.6
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Physeteridae						
Sperm whale	*Physeter macrocephalus*	North Atlantic	E; Y	4,349 (0.28; 3,451; 2016)	3.9	0
Family Delphinidae						
Long-finned pilot whale	*Globicephala melas*	Western North Atlantic	-/-; N	39,215 (0.3; 30,627; 2016)	306	21
Bottlenose dolphin	*Tursiops spp.*	Western North Atlantic Offshore	-/-; N	62,851 (0.213; 51,914; 2016)	519	28
Common dolphin	*Delphinus delphis*	Western North Atlantic	-/-; N	172,974 (0.21; 145,216; 2016)	1,452	399
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	Western North Atlantic	-/-; N	92,233 (0.71; 54,433; 2016)	544	26
Risso's dolphin	*Grampus griseus*	Western North Atlantic	-/-; N	35,493 (0.19; 30,289; 2016)	303	54.3
Family Phocoenidae (porpoises)						
Harbor porpoise	*Phocoena phocoena*	Gulf of Maine/Bay of Fundy	-/-; N	95,543 (0.31; 74,034; 2016)	851	217
Order Carnivora – Superfamily Pinnipedia						
Family Phocidae (earless seals)						
Gray seal [5]	*Halichoerus grypus*	Western North Atlantic	-/-; N	27,131 (0.19; 23,158, 2016)	1,389	4,729
Harbor seal	*Phoca vitulina*	Western North Atlantic	-/-; N	75,834 (0.15; 66,884, 2012)	2,006	350

1 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.
2- NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments.* CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable (NA).
3 - These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, ship strike).
4- This is the latest stock abundance estimate and Nmin as presented in Pace (2021).
5- NMFS stock abundance estimate (and associated PBR value) applies to U.S. population only. Total stock abundance (including animals in Canada) is approximately 451,431. The annual M/SI value is given for the total stock.

As indicated above, all 14 species (with 14 managed stocks) in Table 2 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur. All species that could potentially occur in the proposed survey areas are included in Table 2 of the IHA application. However, the temporal and/or spatial occurrence of several species listed in Table 2 in Vineyard Wind 1's IHA application is such that take of these species is not expected to occur. Killer whale (*Orcinus orca*) Northern bottlenose whale (*Hyperoodon ampullatus*), pygmy killer whale (*Feresa attenuata*), false killer whale (*Pseudorca crassidens*), melon-headed whale (*Peponocephala electra*), pantropical spotted dolphin (*Stenella attenuata*), Fraser's dolphin (*Lagenodelphis hosei*), rough-toothed dolphin (*Steno bredanensis*), Clymene dolphin (*Stenella clymene*), spinner dolphin (*Stenella longirostris*), and hooded seal (*Cystophora cristata*), are not expected to occur within the project area based on a lack of sightings in the area and their known habitat preferences and distributions. The blue whale (*Balaenoptera musculus*), Cuvier's beaked whale (*Ziphius cavirostris*), four species of Mesoplodont beaked whale (*Mesoplodon spp.*), dwarf and pygmy sperm whale (*Kogia sima* and *Kogia breviceps*), and striped dolphin (*Stenella coeruleoalba*), typically occur further offshore than the project area, while short-finned pilot whales (*Globicephala macrorhynchus*) and Atlantic spotted dolphins (*Stenella frontalis*) are typically found further south than the project area (Hayes *et al.*, 2020). There are stranding records of harp seals (*Pagophilus*

groenlandicus) in Massachusetts, but the species typically occurs north of the project area and appearances in Massachusetts usually occur between January and May (Hayes *et al.*, 2020), outside of the months that Vineyard Wind 1 is most likely to conduct the majority of the survey activities.

Vineyard Wind observed two white beaked dolphins during surveys authorized under a previous IHA (85 FR 42357; July 14, 2020). Please see *https://www.fisheries.noaa.gov/action/incidental-take-authorization-vineyard-wind-llc-marine-site-characterization-surveys* for additional information on this sighting. Except for the single observation of white beaked dolphins referenced here, no sightings of white beaked dolphins have been reported in monitoring reports from issued IHAs in the same region in recent years, and encounters with the species in the survey area remain unlikely. Given the low likelihood of occurrence of white beaked dolphins, NMFS does not propose to include take of white beaked dolphins in this IHA. As take of these species is not anticipated as a result of the proposed activities, these species are not discussed further.

In addition to what is included in Sections 3 and 4 of Vineyard Wind 1's application, the SARs, and NMFS's website, further detail informing the baseline for select species (*i.e.*, information regarding current Unusual Mortality Events (UME) and important habitat areas) is provided below.

North Atlantic Right Whale

The North Atlantic right whale ranges from the calving grounds in the southeastern United States to feeding grounds in New England waters and into Canadian waters (Waring *et al*., 2017). Surveys indicate that there are seven areas where NARWs congregate seasonally, including Georges Basin along the northeastern edge of Georges Bank, Cape Cod and Massachusetts Bay (Hayes *et al*. 2018). Aerial surveys indicated that right whales were consistently detected in or near the Lease Area and surrounding

survey areas during the winter and spring seasons. Acoustic detections of right whales occurred during all months of the year, with the highest number of detections typically between December and late May. Data indicate that right whales occur at elevated densities in the project area south and southwest of Martha's Vineyard in the spring (March-May) and south of Nantucket during winter (December-February; Roberts *et al*. 2018; Leiter *et al*. 2017; Kraus *et al*. 2016). Consistent aggregations of right whales feeding and possibly mating within or close to these specific areas is such that they have been considered right whale "hotspots" (Leiter *et al*. 2017; Kraus *et al*. 2016). Although there is variability in right whale distribution patterns among years, and some aggregations appear to be ephemeral, an analysis of hot spots suggests that there is some regularity in right whale use of the project area (Kraus *et al*. 2016).

Additionally, numerous Dynamic Management Areas (DMAs) have been established in these areas in recent years. NMFS may establish DMAs when and where NARWs are sighted outside Seasonal Management Areas (SMAs). DMAs are generally in effect for two weeks. During this time, vessels are encouraged to avoid these areas or reduce speeds to 10 knots (5.1 m/s) or less while transiting through these areas.

NMFS's regulations at 50 CFR part 224.105 designated nearshore waters of the Mid-Atlantic Bight as Mid-Atlantic U.S. SMAs for right whales in 2008. SMAs were developed to reduce the threat of collisions between ships and right whales around their migratory route and calving grounds. All vessels greater than 19.8 m (65 ft) in overall length must operate at speeds of 10 knots (5.1 m/s) or less within these areas during specific time periods. The Block Island Sound SMA overlaps with the south/east portion of Lease Area OCS-A 0501 and is active between November 1 and April 30 each year.

The project area overlaps with a right whale Biologically Important Area (BIA) for migration from March to April and from November to December (LaBrecque *et al*. 2015). Identified right whale feeding BIAs occur outside of the project area (map

showing designated BIAs is available at: *https://cetsound.noaa.gov/biologically-important-area-map);* however, Oleson *et al.* (2020) identified an area south of Martha's Vineyard and Nantucket, referred to as "South of the Islands," as a newer, year-round, core North Atlantic right whale foraging habitat. The South of the Islands area overlaps with most of Vineyard Wind 1's project area.

The western North Atlantic population demonstrated overall growth of 2.8 percent per year from 1990 to 2010, despite a decline in 1993 and no growth between 1997 and 2000 (Pace *et al*. 2017). However, since 2010 the population has been in decline, with a 99.99 percent probability of a decline of just under 1 percent per year (Pace *et al*. 2017). Between 1990 and 2015, calving rates varied substantially, with low calving rates coinciding with all three periods of decline or no growth (Pace *et al*. 2017). In 2018, no new North Atlantic right whale calves were documented in their calving grounds; this represented the first time since annual NOAA aerial surveys began in 1989 that no new right whale calves were observed. However, in 2019 seven right whale calves were identified, 10 in 2020, and to date 17 live calves have been identified in 2021. Data indicates that the number of adult females fell from 200 in 2010 to 186 in 2015 while males fell from 283 to 272 in the same time frame (Pace *et al*., 2017).

Elevated North Atlantic right whale mortalities have occurred since June 7, 2017. A total of 34 confirmed dead stranded whales (21 in Canada; 13 in the United States), have been documented to date. This event has been declared an Unusual Mortality Event (UME), with human interactions (*i.e*., entanglements and vessel strikes) identified as the most likely cause. More information is available online at: *https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2021-north-atlantic-right-whale-unusual-mortality-event* (accessed May 7, 2020).

Humpback Whale

Prior to 2016, humpback whales were listed under the ESA as an endangered species worldwide. Following a 2015 global status review (Bettridge *et al*., 2015), NMFS delineated 14 distinct population segments (DPS) with different listing statuses (81 FR 62259; September 8, 2016) pursuant to the ESA. The West Indies DPS, which is not listed under the ESA, is the only DPS of humpback whale that is expected to occur in the survey area. Bettridge *et al*. (2015) estimated the size of this population at 12,312 (95 percent CI 8,688-15,954) whales in 2004-05, which is consistent with previous population estimates of approximately 10,000-11,000 whales (Stevick *et al*., 2003; Smith *et al*., 1999) and the increasing trend for the West Indies DPS (Bettridge *et al*., 2015). Whales occurring in the survey area are considered to be from the West Indies DPS, but are not necessarily from the Gulf of Maine feeding population managed as a stock by NMFS.

Kraus *et al.* (2016) observed humpback whales in the Rhode Island/Massachusetts and Massachusetts Wind Energy Areas (RI/MA & MA WEAs) and surrounding areas during all seasons. Humpback whales were observed most often during spring and summer months, with a peak from April to June. Calves were observed 10 times and feeding was observed 10 times during the Kraus *et al.* (2016) study. That study also observed one instance of courtship behavior. Although humpback whales were rarely seen during fall and winter surveys, acoustic data indicate that this species may be present within the MA WEA year-round, with the highest rates of acoustic detections in winter and spring (Kraus *et al*. 2016).

Since January 2016, elevated humpback whale mortalities have occurred along the Atlantic coast from Maine through Florida. The event has been declared a UME. Partial or full necropsy examinations have been conducted on approximately half of the 149 known cases (as of April 28, 2021). A portion of the whales have shown evidence of pre-mortem vessel strike; however, this finding is not consistent across all of the whales

examined so more research is needed. NOAA is consulting with researchers that are conducting studies on the humpback whale populations, and these efforts may provide information on changes in whale distribution and habitat use that could provide additional insight into how these vessel interactions occurred. More detailed information is available at: *https://www.fisheries.noaa.gov/national/marine-life-distress/2016-2021-humpback-whale-unusual-mortality-event-along-atlantic-coast* (accessed April 28, 2021). No BIAs have been identified for humpback whales in the project area.

Fin Whale

Fin whales typically feed in the Gulf of Maine and the waters surrounding New England, but their mating and calving (and general wintering) areas are largely unknown (Hain *et al*. 1992, Hayes *et al*. 2018). Acoustic detections of fin whale singers augment and confirm these visual sighting conclusions for males. Recordings from Massachusetts Bay, New York bight, and deep-ocean areas have detected some level of fin whale singing from September through June (Watkins *et al*. 1987, Clark and Gagnon 2002, Morano *et al*. 2012). These acoustic observations from both coastal and deep-ocean regions support the conclusion that male fin whales are broadly distributed throughout the western North Atlantic for most of the year (Hayes *et al*. 2019).

Kraus *et al*. (2016) suggest that, compared to other baleen whale species, fin whales have a high multi-seasonal relative abundance in the RI/MA & MA WEAs and surrounding areas. Fin whales were observed in the MA WEA in spring and summer. This species was observed primarily in the offshore (southern) regions of the RI/MA & MA WEAs during spring and was found closer to shore (northern areas) during the summer months (Kraus *et al*. 2016). Calves were observed three times and feeding was observed nine times during the Kraus *et al*. (2016) study. Although fin whales were largely absent from visual surveys in the RI/MA & MA WEAs in the fall and winter

months (Kraus *et al*. 2016), acoustic data indicated that this species was present in the RI/MA & MA WEAs during all months of the year.

New England waters represent a major feeding ground for fin whales. The proposed project area would overlap spatially and temporally with a feeding BIA for fin whales, from March to October (LaBrecque *et al*. 2015). The separate year-round feeding BIA to the northeast does not overlap with the project area.

Sei Whale

The Nova Scotia stock of sei whales can be found in deeper waters of the continental shelf edge waters of the northeastern United States and northeastward to south of Newfoundland. NMFS considers sei whales occurring from the U.S. East Coast to Cape Breton, Nova Scotia, and east to 42° as the Nova Scotia stock of sei whales (Waring *et al*. 2016; Hayes *et al*. 2018). In the Northwest Atlantic, it is speculated that the whales migrate from south of Cape Cod along the eastern Canadian coast in June and July, and return on a southward migration again in September and October (Waring *et al*. 2014; 2017). Spring is the period of greatest abundance in U.S. waters, with sightings concentrated along the eastern margin of Georges Bank and into the Northeast Channel area, and along the southwestern edge of Georges Bank in the area of Hydrographer Canyon (Waring *et al*., 2015). A BIA for sei whale feeding occurs east of, but near, the project area from May through November (LaBrecque *et al*. 2015).

Minke Whale

Minke whales occur in temperate, tropical, and high-latitude waters. The Canadian East Coast stock occur in the area from the western half of the Davis Strait (45 °W) to the Gulf of Mexico (Waring *et al*., 2017). This species generally occupies waters less than 100 m deep on the continental shelf. There appears to be a strong seasonal component to minke whale distribution in which spring to fall are times of relatively widespread and common occurrence, and when the whales are most abundant in New

England waters, while during winter the species appears to be largely absent (Waring *et al*., 2017).

Kraus *et al*. (2016) observed minke whales in the RI/MA & MA WEAs and surrounding areas primarily from May to June. This species demonstrated a distinct seasonal habitat usage pattern that was consistent throughout the study. Though minke whales were observed in spring and summer months in the MA WEA, they were only observed in the lease areas in the spring. Minke whales were not observed between October and February, but acoustic data indicate the presence of this species in the offshore proposed project area in winter months. A BIA for minke whale feeding occurs east of, but near, the project area from March to November.

Since January 2017, elevated minke whale strandings have occurred along the Atlantic coast from Maine through South Carolina, with highest numbers in Massachusetts, Maine, and New York. Partial or full necropsy examinations have been conducted on more than 60 percent of the 105 known cases (as of April 28, 2021). Preliminary findings in several of the whales have shown evidence of human interactions or infectious disease. These findings are not consistent across all of the whales examined, so more research is needed. More information is available at: *https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2021-minke-whale-unusual-mortality-event-along-atlantic-coast* (accessed April 28, 2021).

Sperm Whale

The distribution of the sperm whale in the U.S. Exclusive Economic Zone (EEZ) occurs on the continental shelf edge, over the continental slope, and into mid-ocean regions (Waring *et al*. 2015). Sperm whales are somewhat migratory; however, their migrations are not as specific as seen in most of the baleen whale species. In the North Atlantic, there appears to be a general shift northward during the summer, but there is no clear migration in some temperate areas (Rice 1989). In summer, the distribution of

sperm whales includes the area east and north of Georges Bank and into the Northeast Channel region, as well as the continental shelf (inshore of the 100-m isobath) south of New England. In the fall, sperm whale occurrence south of New England on the continental shelf is at its highest level, and there remains a continental shelf edge occurrence in the mid-Atlantic bight. In winter, sperm whales are concentrated east and northeast of Cape Hatteras. Their distribution is typically associated with waters over the continental shelf break and the continental slope and into deeper waters (Whitehead *et al*. 1991). Sperm whale concentrations near drop-offs and areas with strong currents and steep topography are correlated with high productivity. These whales occur almost exclusively at the shelf break, regardless of season.

Kraus *et al*. (2016) observed sperm whales four times in the RI/MA & MA WEAs during the summer and fall from 2011 to 2015. Sperm whales, traveling singly or in groups of three or four, were observed three times in August and September of 2012, and once in June of 2015.

Long-Finned Pilot Whale

Long-finned pilot whales occur from North Carolina north to Iceland, Greenland and the Barents Sea (Waring *et al*., 2016). They generally occur along the edge of the continental shelf (a depth of 330 to 3,300 feet (100 to 1,000 meters)), choosing areas of high relief or submerged banks in cold or temperate shoreline waters. In the western North Atlantic, long-finned pilot whales are pelagic, occurring in especially high densities in winter and spring over the continental slope, then moving inshore and onto the shelf in summer and autumn following squid and mackerel populations (Reeves *et al*. 2002). They frequently travel into the central and northern Georges Bank, Great South Channel, and Gulf of Maine areas during the late spring and remain through early fall (May and October) (Payne and Heinemann 1993).

Note that long-finned and short-finned pilot whales overlap spatially along the mid-Atlantic shelf break between New Jersey and the southern flank of Georges Bank (Payne and Heinemann 1993, Hayes *et al*. 2017) Long-finned pilot whales have occasionally been observed stranded as far south as South Carolina, and short-finned pilot whale have stranded as far north as Massachusetts (Hayes *et al*. 2017). The latitudinal ranges of the two species therefore remain uncertain. However, north of approximately 42° N (slightly north of the project area), most pilot whale sightings are expected to be long-finned pilot whales (Hayes *et al*. 2017). Based on the distributions described in Hayes *et al*. (2017), pilot whale sightings in the project area would are expected to be long-finned pilot whales.

Kraus *et al*. (2016) observed pilot whales infrequently in the RI/MA & MA WEAs and surrounding areas. No pilot whales were observed during the fall or winter, and these species were only observed 11 times in the spring and three times in the summer.

Atlantic White-Sided Dolphin

White-sided dolphins occur in temperate and sub-polar waters of the North Atlantic, primarily in continental shelf waters to the 100-m depth contour from central West Greenland to North Carolina (Waring *et al*., 2017). The Gulf of Maine stock is most common in continental shelf waters from Hudson Canyon to Georges Bank, and in the Gulf of Maine and lower Bay of Fundy. Sighting data indicate seasonal shifts in distribution (Northridge *et al*., 1997). During January to May, low numbers of white-sided dolphins are found from Georges Bank to Jeffreys Ledge (off New Hampshire), with even lower numbers south of Georges Bank, as documented by a few strandings collected on beaches of Virginia to South Carolina. From June through September, large numbers of white-sided dolphins are found from Georges Bank to the lower Bay of Fundy. From October to December, white-sided dolphins occur at intermediate densities

from southern Georges Bank to southern Gulf of Maine (Payne and Heinemann 1990). Sightings south of Georges Bank, particularly around Hudson Canyon, occur year round but at low densities.

Kraus *et al*. (2016) suggest that Atlantic white-sided dolphins occur infrequently in the RI/MA & MA WEAs and surrounding areas. Effort-weighted average sighting rates for Atlantic white-sided dolphins could not be calculated, because this species was only observed on eight occasions throughout the duration of the study (October 2011 to June 2015). No Atlantic white-sided dolphins were observed during the winter months, and this species was only sighted twice in the fall and three times in the spring and summer.

Common Dolphin

The common dolphin occurs world-wide in temperate to subtropical seas. In the North Atlantic, common dolphins commonly occur over the continental shelf between the 100-m and 2,000-m isobaths and over prominent underwater topography and east to the mid-Atlantic Ridge (Waring *et al*., 2016). This species is found between Cape Hatteras and Georges Bank from mid-January to May, although they migrate onto the northeast edge of Georges Bank in the fall where large aggregations occur (Kenney and Vigness-Raposa 2009), where large aggregations occur on Georges Bank in fall (Waring *et al*. 2007). Kraus *et al*. (2016) suggested that common dolphins occur year-round in the RI/MA & MA WEAs and surrounding areas. Common dolphins were the most frequently observed small cetacean species within the Kraus *et al*. (2016) study area. Common dolphins were observed in the RI/MA & MA WEAs in all seasons and observed in the Lease Area OCS-A 0501 in spring, summer, and fall.

Bottlenose Dolphin

Bottlenose dolphins encountered in the survey area would likely belong to the Western North Atlantic Offshore Stock (Hayes *et al*. 2020). While, it is possible that a

few animals encountered during the surveys could be from the North Atlantic Northern Migratory Coastal Stock, they generally do not range farther north than New Jersey, and therefore, such an occurrence would be unlikely, and take of the North Atlantic Northern Migratory Coastal Stock is not considered further. Kraus *et al*. (2016) observed common bottlenose dolphins during all seasons within the RI/MA & MA WEAs. Common bottlenose dolphins were the second most commonly observed small cetacean species and exhibited little seasonal variability in abundance. They were observed in the MA WEA in all seasons and observed in Lease Area OCS-A 0501 in the fall and winter.

Risso's Dolphins

Off the northeastern U.S. coast, Risso's dolphins are distributed along the continental shelf edge from Cape Hatteras northward to Georges Bank during spring, summer, and autumn (CETAP 1982; Payne *et al*. 1984). In winter, the range is in the mid-Atlantic Bight and extends outward into oceanic waters (Payne *et al*. 1984). Kraus *et al*. (2016) results suggest that Risso's dolphins occur infrequently in the RI/MA & MA WEAs and surrounding areas.

Harbor Porpoise

The Gulf of Maine/Bay of Fundy stock of harbor porpoise may occur in the project area. This stock occurs in U.S. and Canadian Atlantic waters and is concentrated in the northern Gulf of Maine and southern Bay of Fundy region, generally in waters less than 150 m deep (Waring *et al*., 2017). During fall (October-December) and spring (April-June) harbor porpoises are widely dispersed from New Jersey to Maine. During winter (January to March), intermediate densities of harbor porpoises occur in waters off New Jersey to North Carolina, and lower densities are found in waters off New York to New Brunswick, Canada. They occur from the coastline to deep waters (>1800 m; Westgate *et al*. 1998), although the majority of the population is found over the continental shelf (Waring *et al*., 2017).

Kraus *et al*. (2016) indicate that harbor porpoises occur within the RI/MA & MA WEAs in fall, winter, and spring. Harbor porpoises were observed in groups ranging in size from three to 15 individuals and were primarily observed in the Kraus *et al*. (2016) study area from November through May, with very few sightings during June through September.

Harbor Seal

Harbor seals occur year-round in the coastal waters of eastern Canada and Maine (Katona *et al*. 1993), and occur seasonally along the coasts from southern New England to New Jersey from September through late May. While harbor seals occur year-round north of Cape Cod, they only occur during winter migration, typically September through May, south of Cape Cod (Southern New England to New Jersey; Waring *et al*. 2015; Kenney and Vigness-Raposa 2009).

Gray Seal

The western North Atlantic stock of gray seal occurs in the project area. The range for this stock is thought to be from New Jersey to Labrador. Current population trends show that gray seal abundance is likely increasing in the U.S. Atlantic EEZ (Waring *et al*., 2017). Gray seals are expected to occur year-round in at least some potential OECC routes, with seasonal occurrence in the offshore areas from September to May (Hayes *et al*. 2018).

Since July 2018, elevated numbers of harbor seal and gray seal mortalities have occurred across Maine, New Hampshire and Massachusetts. This event has been declared a UME. Additionally, seals showing clinical signs of stranding have occurred as far south as Virginia, although not in elevated numbers. Therefore the UME investigation now encompasses all seal strandings from Maine to Virginia (including harp and hooded seals, though no take of either species is proposed for authorization). Between July 1, 2018 and April 28, 2021, a total of 3,152 seal strandings have been recorded as part of this

designated Northeast Pinniped UME. Based on tests conducted so far, the main pathogen found in the seals is phocine distemper virus. Additional testing to identify other factors that may be involved in this UME are underway. Please see *https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-life-distress/2018-2020-pinniped-unusual-mortality-event-along* for additional information.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 3.

Table 3 -- Marine Mammal Hearing Groups (NMFS, 2018)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, *Kogia*, river dolphins, cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz
* Represents the generalized hearing range for the entire group as a composite (*i.e.,* all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al.* 2007) and PW pinniped (approximation).	

The pinniped functional hearing group was modified from Southall *et al*. (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al*., 2006; Kastelein *et al*., 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information. 14 marine mammal species (12 cetacean and two phocids pinnipeds) have the reasonable potential to co-occur with the proposed survey activities. Please refer to Table 2. Of the cetacean species that may be present, five are classified as low-frequency cetaceans (*i.e*., all mysticete species), six are classified as mid-frequency cetaceans (*i.e*., all delphinid species and the sperm whale), and one is classified as high-frequency cetaceans (*i.e*., harbor porpoise).

Potential Effects of Specified Activities on Marine Mammals and their Habitat

This section includes a summary of the ways that Vineyard Wind 1's specified activity may impact marine mammals and their habitat. Detailed descriptions of the potential effects of similar specified activities have been provided in other recent **Federal Register** notices, including for survey activities using the same methodology, over a similar amount of time, and occurring within the same specified geographical region (*e.g.*, 82 FR 20563, May 3, 2017; 85 FR 36537, June 17, 2020; 85 FR 37848, June 24, 2020; 85 FR 48179, August 10, 2020). No significant new information is available, and

we refer the reader to these documents rather than repeating the details here. The **Estimated Take** section includes a quantitative analysis of the number of individuals that are expected to be taken by Vineyard Wind 1's activity. The **Negligible Impact Analysis and Determination** section considers the potential effects of the specified activity, the **Estimated Take** section, and the **Proposed Mitigation** section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely to impact marine mammal species or stocks.

Background on Active Acoustic Sound Sources and Acoustic Terminology

This subsection contains a brief technical background on sound, on the characteristics of certain sound types, and on metrics used in this proposal inasmuch as the information is relevant to the specified activity and to the summary of the potential effects of the specified activity on marine mammals. For general information on sound and its interaction with the marine environment, please see, *e.g.*, Au and Hastings (2008); Richardson *et al*. (1995); Urick (1983).

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz or cycles per second. Wavelength is the distance between two peaks or corresponding points of a sound wave (length of one cycle). Higher frequency sounds have shorter wavelengths than lower frequency sounds, and typically attenuate (decrease) more rapidly, except in certain cases in shallower water. Amplitude is the height of the sound pressure wave or the "loudness" of a sound and is typically described using the relative unit of the decibel. A sound pressure level (SPL) in dB is described as the ratio between a measured pressure and a reference pressure (for underwater sound, this is 1 microPascal (μPa)), and is a logarithmic unit that accounts for large variations in amplitude. Therefore, a relatively

small change in dB corresponds to large changes in sound pressure. The source level (SL) represents the SPL referenced at a distance of 1 m from the source (referenced to 1 µPa), while the received level is the SPL at the listener's position (referenced to 1 µPa).

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. Root mean square is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1983). Root mean square accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures.

Sound exposure level (SEL; represented as dB re 1 μPa^2-s) represents the total energy in a stated frequency band over a stated time interval or event and considers both intensity and duration of exposure. The per-pulse SEL is calculated over the time window containing the entire pulse (*i.e.*, 100 percent of the acoustic energy). SEL is a cumulative metric; it can be accumulated over a single pulse, or calculated over periods containing multiple pulses. Cumulative SEL represents the total energy accumulated by a receiver over a defined time window or during an event. Peak sound pressure (also referred to as zero-to-peak sound pressure or 0-pk) is the maximum instantaneous sound pressure measurable in the water at a specified distance from the source and is represented in the same units as the rms sound pressure.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in a manner similar to ripples on the surface of a pond and may be either directed in a beam or beams or may radiate in all directions (omnidirectional sources), as is the case for sound produced by the pile driving activity

considered here. The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound, which is defined as environmental background sound levels lacking a single source or point (Richardson *et al*., 1995). The sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.*, wind and waves, earthquakes, ice, atmospheric sound), biological (*e.g.*, sounds produced by marine mammals, fish, and invertebrates), and anthropogenic (*e.g.*, vessels, dredging, construction) sound. A number of sources contribute to ambient sound, including wind and waves, which are a main source of naturally occurring ambient sound for frequencies between 200 Hz and 50 kHz (Mitson, 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Precipitation can become an important component of total sound at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times. Marine mammals can contribute significantly to ambient sound levels, as can some fish and snapping shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz. Sources of ambient sound related to human activity include transportation (surface vessels), dredging and construction, oil and gas drilling and production, geophysical surveys, sonar, and explosions. Vessel noise typically dominates the total ambient sound for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly.

The sum of the various natural and anthropogenic sound sources that comprise ambient sound at any given location and time depends not only on the source levels (as determined by current weather conditions and levels of biological and human activity)

but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10-20 dB from day to day (Richardson *et al*., 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals. Details of source types are described in the following text.

Sounds are often considered to fall into one of two general types: pulsed and non-pulsed (defined in the following). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.*, Ward, 1997 in Southall *et al*., 2007). Please see Southall *et al*. (2007) for an in-depth discussion of these concepts. The distinction between these two sound types is not always obvious, as certain signals share properties of both pulsed and non-pulsed sounds. A signal near a source could be categorized as a pulse, but due to propagation effects as it moves farther from the source, the signal duration becomes longer (*e.g.*, Greene and Richardson, 1988).

Pulsed sound sources (*e.g.*, airguns, explosions, gunshots, sonic booms, impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI, 1986, 2005; Harris, 1998; NIOSH, 1998; ISO, 2003) and occur either as isolated events or repeated in some succession. Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a rapid decay period that may include a period of diminishing,

oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features.

Non-pulsed sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or intermittent (ANSI, 1995; NIOSH, 1998). Some of these non-pulsed sounds can be transient signals of short duration but without the essential properties of pulses (*e.g.*, rapid rise time). Examples of non-pulsed sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

Sparkers and boomers produce pulsed signals with energy in the frequency ranges specified in Table 1. The amplitude of the acoustic wave emitted from sparker sources is equal in all directions (*i.e.*, omnidirectional), while other sources planned for use during the proposed surveys have some degree of directionality to the beam, as specified in Table 1. Other sources planned for use during the proposed survey activity (*e.g.*, CHIRP SBPs) should be considered non-pulsed, intermittent sources.

Summary on Specific Potential Effects of Acoustic Sound Sources

Underwater sound from active acoustic sources can include one or more of the following: temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, stress, and masking. The degree of effect is intrinsically related to the signal characteristics, received level, distance from the source, and duration of the sound exposure. Marine mammals exposed to high-intensity sound, or to lower-intensity sound for prolonged periods, can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Finneran, 2015). TS can be permanent (PTS), in which case the loss of hearing sensitivity is not fully recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time (Southall *et al.*, 2007).

Animals in the vicinity of Vineyard Wind 1's proposed HRG survey activity are unlikely to incur even TTS due to the characteristics of the sound sources, which include relatively low source levels (176 to 205 dB re 1 µPa-m) and generally very short pulses and potential duration of exposure. These characteristics mean that instantaneous exposure is unlikely to cause TTS, as it is unlikely that exposure would occur close enough to the vessel for received levels to exceed peak pressure TTS criteria, and that the cumulative duration of exposure would be insufficient to exceed cumulative sound exposure level (SEL) criteria. Even for high-frequency cetacean species (*e.g.*, harbor porpoises), which have the greatest sensitivity to potential TTS, individuals would have to make a very close approach and also remain very close to vessels operating these sources in order to receive multiple exposures at relatively high levels, as would be necessary to cause TTS. Intermittent exposures—as would occur due to the brief, transient signals produced by these sources—require a higher cumulative SEL to induce TTS than would continuous exposures of the same duration (*i.e.*, intermittent exposure results in lower levels of TTS). Moreover, most marine mammals would more likely avoid a loud sound source rather than swim in such close proximity as to result in TTS. Kremser *et al.* (2005) noted that the probability of a cetacean swimming through the area of exposure when a sub-bottom profiler emits a pulse is small—because if the animal was in the area, it would have to pass the transducer at close range in order to be subjected to sound levels that could cause TTS and would likely exhibit avoidance behavior to the area near the transducer rather than swim through at such a close range. Further, the restricted beam shape of many of HRG survey devices planned for use (Table 1) makes it unlikely that an animal would be exposed more than briefly during the passage of the vessel.

Behavioral disturbance may include a variety of effects, including subtle changes in behavior (*e.g.*, minor or brief avoidance of an area or changes in vocalizations), more

conspicuous changes in similar behavioral activities, and more sustained and/or potentially severe reactions, such as displacement from or abandonment of high-quality habitat. Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (*e.g.*, species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors. Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal.

In addition, sound can disrupt behavior through masking, or interfering with, an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g.*, those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation). Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher intensity, and may occur whether the sound is natural (*e.g.*, snapping shrimp, wind, waves, precipitation) or anthropogenic (*e.g.*, shipping, sonar, seismic exploration) in origin. Marine mammal communications would not likely be masked appreciably by the acoustic signals given the directionality of the signals for most HRG survey equipment types planned for use (Table 1) and the brief period when an individual mammal is likely to be exposed.

Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.*, crustaceans, cephalopods, fish, zooplankton) (*i.e.*, effects to marine mammal habitat). Prey species exposed to sound might move away from the sound source, experience TTS, experience masking of biologically relevant sounds, or show no obvious direct effects. The most likely impacts (if any) for most prey species in a given area would be temporary avoidance of the area. Surveys using active acoustic sound sources move through an area relatively quickly, limiting exposure to

multiple pulses. In all cases, sound levels would return to ambient once a survey ends and the noise source is shut down and, when exposure to sound ends, behavioral and/or physiological responses are expected to end relatively quickly. Finally, the HRG survey equipment will not have significant impacts to the seafloor and does not represent a source of pollution.

Vessel Strike

Vessel collisions with marine mammals, or ship strikes, can result in death or serious injury of the animal. These interactions are typically associated with large whales, which are less maneuverable than are smaller cetaceans or pinnipeds in relation to large vessels. Ship strikes generally involve commercial shipping vessels, which are generally larger and of which there is much more traffic in the ocean than geophysical survey vessels. Jensen and Silber (2004) summarized ship strikes of large whales worldwide from 1975-2003 and found that most collisions occurred in the open ocean and involved large vessels (*e.g.*, commercial shipping). For vessels used in geophysical survey activities, vessel speed while towing gear is typically only 4-5 knots. At these speeds, both the possibility of striking a marine mammal and the possibility of a strike resulting in serious injury or mortality are so low as to be discountable. At average transit speed for geophysical survey vessels, the probability of serious injury or mortality resulting from a strike is less than 50 percent. However, the likelihood of a strike actually happening is again low given the smaller size of these vessels and generally slower speeds. Notably in the Jensen and Silber study, no strike incidents were reported for geophysical survey vessels during that time period.

The potential effects of Vineyard Wind 1's specified survey activity are expected to be limited to Level B behavioral harassment. No permanent or temporary auditory effects, or significant impacts to marine mammal habitat, including prey, are expected.

Estimated Take

This section provides an estimate of the number of incidental takes proposed for authorization through this IHA, which will inform both NMFS's consideration of "small numbers" and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would be by Level B harassment only, in the form of disruption of behavioral patterns for individual marine mammals resulting from exposure to HRG sources. Based primarily on the characteristics of the signals produced by the acoustic sources planned for use, Level A harassment is neither anticipated (even absent mitigation) nor proposed to be authorized. Consideration of the anticipated effectiveness of the mitigation measures (*i.e.*, exclusion zones (EZs) and shutdown measures) discussed in detail below in the **Proposed Mitigation** section, further strengthens the conclusion that Level A harassment is not a reasonably anticipated outcome of the survey activity. As described previously, no serious injury or mortality is anticipated or proposed to be authorized for this activity. Below we describe how the take is estimated.

Generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) and the number of days of activities. We note that while these basic factors can contribute to a basic

calculation to provide an initial prediction of takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.,* previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimates.

Acoustic Thresholds

NMFS recommends the use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment– Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.,* 2007, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 160 dB re 1 µPa (rms) for the impulsive sources (*i.e.*, boomers, sparkers) and non-impulsive, intermittent sources (*e.g.*, chirp SBPs) evaluated here for Vineyard Wind 1's proposed activity.

Level A harassment- NMFS's Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to

noise from two different types of sources (impulsive or non-impulsive). For more information, see NMFS's 2018 Technical Guidance, which may be accessed at *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

Vineyard Wind 1's proposed activity includes the use of impulsive (*i.e.*, sparkers and boomers) and non-impulsive (*e.g.*, CHIRP SBP) sources. However, as discussed above, NMFS has concluded that Level A harassment is not a reasonably likely outcome for marine mammals exposed to noise through use of the sources proposed for use here, and the potential for Level A harassment is not evaluated further in this document. Please see Vineyard Wind 1's application for details of a quantitative exposure analysis exercise, *i.e.*, calculated Level A harassment isopleths and estimated Level A harassment exposures. Maximum estimated Level A harassment isopleths were less than 5 m for all sources and hearing groups with the exception of an estimated 53 m zone calculated for high-frequency cetaceans during use of the Applied Acoustics AA251 Boomer, (see Table 1 for source characteristics). Vineyard Wind 1 did not request authorization of take by Level A harassment, and no take by Level A harassment is proposed for authorization by NMFS.

Ensonified Area

NMFS has developed a user-friendly methodology for estimating the extent of the Level B harassment isopleths associated with relevant HRG survey equipment (NMFS, 2020). This methodology incorporates frequency and directionality to refine estimated ensonified zones. For acoustic sources that operate with different beamwidths, the maximum beamwidth was used, and the lowest frequency of the source was used when calculating the frequency-dependent absorption coefficient (Table 1).

NMFS considers the data provided by Crocker and Fratantonio (2016) to represent the best available information on source levels associated with HRG equipment

and, therefore, recommends that source levels provided by Crocker and Fratantonio (2016) be incorporated in the method described above to estimate isopleth distances to harassment thresholds. In cases when the source level for a specific type of HRG equipment is not provided in Crocker and Fratantonio (2016), NMFS recommends that either the source levels provided by the manufacturer be used, or, in instances where source levels provided by the manufacturer are unavailable or unreliable, a proxy from Crocker and Fratantonio (2016) be used instead. Table 1 shows the HRG equipment types that may be used during the proposed surveys and the source levels associated with those HRG equipment types.

Results of modeling using the methodology described above indicated that, of the HRG survey equipment planned for use by Vineyard Wind 1 that has the potential to result in Level B harassment of marine mammals, the Applied Acoustics AA251 Boomer would produce the largest Level B harassment isopleth (178 m; see Table 7 of Vineyard Wind 1's application). The estimated Level B harassment isopleth associated with the GeoMarine Geo Spark 2000 (400 tip) system planned for use is 141 m. Although Vineyard Wind 1 does not expect to use the AA251 Boomer source on all planned survey days, it proposes to assume, for purposes of analysis, that the boomer would be used on all survey days. This is a conservative approach, as the actual sources used on individual survey days may produce smaller harassment distances.

Marine Mammal Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations.

Density estimates for all species within the project area were derived from habitat-based density modeling results reported by Roberts *et al.* (2016, 2017, 2018, 2020). The data presented by Roberts *et al.* (2016, 2017, 2018, 2020) incorporates aerial and shipboard line-transect survey data from NMFS and other organizations and

incorporates data from 8 physiographic and 16 dynamic oceanographic and biological covariates, and controls for the influence of sea state, group size, availability bias, and perception bias on the probability of making a sighting. These density models were originally developed for all cetacean taxa in the U.S. Atlantic (Roberts *et al.,* 2016). In subsequent years, certain models have been updated based on additional data as well as certain methodological improvements. More information is available online at *https://seamap.env.duke.edu/models/Duke/EC/*.

Marine mammal density estimates in the survey area (animals/km^2) were obtained using the most recent model results for all taxa (Roberts *et al.,* 2016, 2017, 2018, 2020). We note the availability of a more recent model version for the North Atlantic right whale. However, this latest update resulted in changed predictions only for Cape Cod Bay and, therefore, would not result in changes to the take estimate presented herein. More information is available online at: *https://seamap.env.duke.edu/models/Duke/EC/EC_North_Atlantic_right_whale_history.html*. The updated models incorporate additional sighting data, including sightings from NOAA's Atlantic Marine Assessment Program for Protected Species (AMAPPS) surveys. Roberts *et al.* (2016, 2017, 2018, 2020) provide abundance estimates for species or species guilds within 10 km x 10 km grid cells (100 km^2; except North Atlantic right whale- see discussion below) on a monthly or annual basis, depending on the species.

For the exposure analysis, density data from Roberts *et al.* (2016, 2017, 2018, 2020) were mapped using a geographic information system (GIS). Vineyard Wind 1 calculated densities within a 50 km buffer polygon around the wind development area perimeter. The 50 km limit was derived from studies demonstrating that received levels, distance from the source, and behavioral context are known to influence marine mammals' probability of behavioral response (Dunlop *et al*. 2017). The monthly density was determined by calculating the mean of all grid cells partially or fully within the

buffer polygon. The average monthly abundance for each species in each survey area was calculated as the mean value of the grid cells within the buffer area in each month and then converted to density (individuals/km^2) by dividing by 100 km^2 (Table 1). Annual mean densities were calculated from monthly densities (Table 4).

The estimated monthly densities of North Atlantic right whales were based on updated model results from Roberts *et al.* (2020). These updated data for North Atlantic right whales are provided as densities (individuals/1 km^2) within 5 km x 5 km grid cells (25 km^2) on a monthly basis. The same GIS process described above was used to select the appropriate grid cells from each month and the monthly North Atlantic right whale density in each survey area was calculated as the mean value of the grid cells as described above. Additional data regarding average group sizes from survey effort in the region was considered to ensure adequate take estimates are evaluated.

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate. In order to estimate the number of marine mammals predicted to be exposed to sound levels that would result in harassment, radial distances to predicted isopleths corresponding to harassment thresholds are calculated, as described above. Those distances are then used to calculate the area(s) around the HRG survey equipment predicted to be ensonified to sound levels that exceed harassment thresholds. The area estimated to be ensonified to relevant thresholds in a single day (zone of influence (ZOI)) is then calculated, based on areas predicted to be ensonified around the HRG survey equipment (*i.e.*, 178 m) and the estimated trackline distance traveled per day by the survey vessel (*i.e.*, 80 km). Based on the maximum estimated distance to the Level B harassment threshold of 178 m (Applied Acoustics AA251 Boomer) and the maximum estimated daily track line distance of 80 km, the ZOI is estimated to be 28.58 km^2 during Vineyard Wind 1's planned HRG surveys. As described above, this is a conservative

estimate as it assumes the HRG source that results in the greatest distance to the Level B harassment isopleth would be operated at all times during all vessel days.

$$ZOI = (Distance/day \times 2r) + \pi r^2$$

Where r is the linear distance from the source to the harassment isopleth.

Potential daily Level B harassment takes are estimated by multiplying the average annual marine mammal densities (animals/km^2), as described above, by the ZOI. Estimated numbers of each species taken over the duration of the authorization are calculated by multiplying the potential daily Level B harassment takes by the total number of vessel days plus a 10 percent buffer (*i.e.*, by 170 vessel days x 1.1 percent = 192.5 vessel days). The product is then rounded, to generate an estimate of the total number of instances of harassment expected for each species over the duration of the survey. A summary of this method is illustrated in the following formula:

$$Estimated\ Take = D \times ZOI \times vessel\ days$$

Where D = average species density (animals/km^2), ZOI = maximum daily ensonified area to relevant threshold, and vessel days = 192.5.

Take by Level B harassment proposed for authorization is shown in Table 4.

Table 4 -- Total Numbers of Potential Incidental Take of Marine Mammals Proposed for Authorization and Proposed Takes as a Percentage of Population

Species of interest	Annual mean density (km^2)	Estimated Takes by Level B Harassment	Proposed Takes by Level B Harassment [a]	Abundance	Percent of Stock
Fin whale	0.00149	8.22	8	6,802	0.13
Humpback whale	0.00084	4.63	5	1,393	0.36
Minke whale	0.00062	3.42	3	21,968	0.02
North Atlantic right whale	0.00164	9.05	9	368	2.72
Sei whale	0.00005	0.28	2	6,292	0.03
Sperm whale	0.00006	0.33	2	4,349	0.05
Atlantic white sided dolphin	0.02226	122.78	123	92,233	0.13
Bottlenose dolphin	0.0403	222.29	222	62,851	0.35

Long-finned pilot whale	0.00459	25.32	25	39,215	0.07
Risso's dolphin	0.00012	0.66	8	35,493	0.02
Common dolphin	0.0544	300.06	3,484	172,974	2.01
Harbor porpoise	0.02858	157.64	158	95,543	0.17
Gray seal[b]	0.09784	539.67	540	27,131	1.99
Harbor seal[b]		539.67	540	75,834	0.71

[a] Increases from calculated values for sei whale, sperm whale, and Risso's dolphin are based on observed group sizes during Vineyard Wind LLC's 2018-2020 surveys (Vineyard Wind 2018, 2020a, 2020b).
[b] Roberts *et al.* (2018) only provides density estimates for seals without differentiating by species. Harbor seals and gray seals are assumed to occur equally; therefore, density values were split evenly between the two species, *i.e.*, total estimated take for "seals" is 1,080.

The take numbers shown in Table 4 are those requested by Vineyard Wind 1, with the exception of certain minor rounding differences. Further, Vineyard Wind 1 requested take of the pilot whale guild, rather than just long-finned pilot whale, but as described previously, pilot whales in the project area are expected to be long-finned pilot whales. Additionally, NMFS increased proposed Level B harassment take of common dolphin to 3,484 takes. This take estimate reflects the daily rate of approximately 18.1 common dolphin observations within the Level B harassment zone per vessel day (3,332 dolphin observations over 184 days) during surveys under Vineyard Wind's previous IHA (85 FR 42357; July 14, 2020), and an estimated 192.5 vessel days, as described above (18.1 takes per day x 192.5 vessel days= 3,484 takes). Given the overlap in project areas, NMFS expects that this estimate is more appropriate than the density-based common dolphin take estimate calculated by Vineyard Wind 1. For all other species, NMFS concurs with the take numbers requested by Vineyard Wind 1 and proposes to authorize them.

Proposed Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses (latter not

applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned); and

(2) The practicability of the measures for applicant implementation, which may consider such things as cost and impact on operations.

Mitigation for Marine Mammals and Their Habitat

NMFS proposes the following mitigation measures be implemented during Vineyard Wind 1's proposed marine site characterization surveys.

Marine Mammal Exclusion Zones and Harassment Zones

Marine mammal EZs would be established around the HRG survey equipment and monitored by protected species observers (PSO):

- 500 m (1,640 ft) EZ for North Atlantic right whales during use of impulsive acoustic sources (*e.g.*, boomers and/or sparkers) and certain non-impulsive acoustic sources (nonparametric sub-bottom profilers); and

- 100 m (328 ft) EZ for all other marine mammals, with certain exceptions specified below, during use of impulsive acoustic sources (*e.g.*, boomers and/or sparkers).

If a marine mammal is detected approaching or entering the EZs during the HRG survey, the vessel operator would adhere to the shutdown procedures described below to minimize noise impacts on the animals. These stated requirements will be included in the training to be provided to the survey team.

Pre-Clearance of the Exclusion Zones

Vineyard Wind 1 would implement a 60-minute pre-clearance period of the EZs prior to the initiation of ramp-up of HRG equipment. This pre-clearance duration was proposed by Vineyard Wind 1. During this period, the EZ will be monitored by the PSO(s), using the appropriate visual technology. Ramp-up may not be initiated if any marine mammal(s) is within its respective EZ. If a marine mammal is observed within an EZ during the pre-clearance period, ramp-up may not begin until the animal(s) has been observed exiting its respective EZ or until an additional time period has elapsed with no further sighting (*i.e.*, 15 minutes for small odontocetes and seals, 60 minutes for North Atlantic right whale, and 30 minutes for all other species). Here and below, the 60-minute North Atlantic right whale clearance period was proposed by Vineyard Wind 1.

Ramp-Up of Survey Equipment

When technically feasible, a ramp-up procedure would be used for HRG survey equipment capable of adjusting energy levels at the start or restart of survey activities. The ramp-up procedure would be used at the beginning of HRG survey activities in order to provide additional protection to marine mammals near the survey area by allowing them to vacate the area prior to the commencement of survey equipment operation at full power.

A ramp-up would begin with the powering up of the smallest acoustic HRG equipment at its lowest practical power output appropriate for the survey. When technically feasible, the power would then be gradually turned up and other acoustic sources would be added.

Ramp-up activities will be delayed if a marine mammal(s) enters its respective EZ. Ramp-up will continue if the animal has been observed exiting its respective EZ or until an additional time period has elapsed with no further sighting (*i.e*, 15 minutes for small odontocetes and seals, 60 minutes for North Atlantic right whale, and 30 minutes for all other species).

Activation of survey equipment through ramp-up procedures may not occur when visual observation of the pre-clearance/exclusion zone is not expected to be effective using the appropriate visual technology (*i.e*., during inclement conditions such as heavy rain or fog).

Shutdown Procedures

An immediate shutdown of the HRG survey equipment would be required if a marine mammal is sighted entering or within its respective EZ. The vessel operator must comply immediately with any call for shutdown by the PSO. Any disagreement between the PSO and vessel operator should be discussed only after shutdown has occurred. Subsequent restart of the survey equipment can be initiated if the animal has been observed exiting its respective EZ or until an additional time period has elapsed (*i.e*, 15 minutes for delphinid cetaceans and seals, 60 minutes for North Atlantic Right Whale, and 30 minutes for all other species).

If a species for which authorization has not been granted, or, a species for which authorization has been granted but the authorized number of takes have been met, approaches or is observed within the Level B harassment zone (178 m impulsive), shutdown would occur.

If the acoustic source is shut down for reasons other than mitigation (*e.g.*, mechanical difficulty) for less than 30 minutes, it may be activated again without ramp-up if PSOs have maintained constant observation and no detections of any marine mammal have occurred within the respective EZs. If the acoustic source is shut down for a period longer than 30 minutes and PSOs have maintained constant observation, then pre-clearance and ramp-up procedures will be initiated as described in the previous section.

The shutdown requirement would be waived for small delphinids of the following genera: *Delphinus*, *Lagenorhynchus (acutus* only*)*, and *Tursiops*. Specifically, if a delphinid from the specified genera is visually detected approaching the vessel (*i.e.*, to bow ride) or towed equipment, shutdown is not required. Furthermore, if there is uncertainty regarding identification of a marine mammal species (*i.e.*, whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived), PSOs must use best professional judgement in making the decision to call for a shutdown. Additionally, shutdown is required if a delphinid detected in the EZ belongs to a genus other than those specified.

Shutdown, pre-start clearance, and ramp-up procedures are not required during HRG survey operations using only non-impulsive sources (e.g., USBL and parametric sub-bottom profilers) other than non-parametric sub-bottom profilers (e.g., CHIRPs). Pre-clearance and ramp-up, but not shutdown, are required when using non-impulsive, non-parametric sub-bottom profilers.

Vessel Strike Avoidance

Vineyard Wind 1 will ensure that vessel operators and crew maintain a vigilant watch for cetaceans and pinnipeds and slow down or stop their vessels to avoid striking these species. Survey vessel crew members responsible for navigation duties will receive site-specific training on marine mammals sighting/reporting and vessel strike avoidance

measures. Vessel strike avoidance measures include the following, except under circumstances when complying with these requirements would put the safety of the vessel or crew at risk:

- Vessel operators and crews must maintain a vigilant watch for all protected species and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any protected species. A visual observer aboard the vessel must monitor a vessel strike avoidance zone based on the appropriate separation distance around the vessel (distances stated below). Visual observers monitoring the vessel strike avoidance zone may be third-party observers (*i.e.*, PSOs) or crew members, but crew members responsible for these duties must be provided sufficient training to (1) distinguish protected species from other phenomena and (2) broadly to identify a marine mammal as a right whale, other whale (defined in this context as sperm whales or baleen whales other than right whales), or other marine mammal;
- All survey vessels, regardless of size, must observe a 10-knot speed restriction in specific areas designated by NMFS for the protection of North Atlantic right whales from vessel strikes including seasonal management areas (SMAs) and dynamic management areas (DMAs) when in effect;
- All vessels greater than or equal to 19.8 m in overall length operating from November 1 through April 30 will operate at speeds of 10 knots or less, except while transiting in Nantucket Sound;
- All vessels must reduce their speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near a vessel;
- All vessels must maintain a minimum separation distance of 500 m from right whales. If a whale is observed but cannot be confirmed as a species other than a

right whale, the vessel operator must assume that it is a right whale and take appropriate action;

- All vessels must maintain a minimum separation distance of 100 m from sperm whales and all other baleen whales;
- All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all other marine mammals, with an understanding that at times this may not be possible (e.g., for animals that approach the vessel);
- When marine mammals are sighted while a vessel is underway, the vessel shall take action as necessary to avoid violating the relevant separation distance (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If marine mammals are sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear or any vessel that is navigationally constrained;
- These requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply; and
- Members of the monitoring team will consult NMFS North Atlantic right whale reporting system and Whale Alert, as able, for the presence of North Atlantic right whales throughout survey operations, and for the establishment of a DMA. If NMFS should establish a DMA in the survey area during the survey, the vessels will abide by speed restrictions in the DMA.

Passive Acoustic Monitoring

Vineyard Wind 1 has proposed to employ trained passive acoustic monitoring (PAM) operators to monitor for acoustic detections of marine mammals during nighttime

HRG survey activities. PAM operators will communicate nighttime detections to the lead PSO on duty who will ensure the implementation of the appropriate mitigation measure. If PAM is not used or is deemed non-functional at any time during the survey, the survey will be shut down until PAM is restored. NMFS does not concur that PAM is an effective technique for detecting mysticetes in order to implement mitigation measures during HRG surveys, given masking that would occur from vessel noise and flow noise. Therefore, NMFS has not included it as a requirement in this proposed IHA.

Seasonal Restrictions

Vineyard Wind 1 will not operate more than three concurrent HRG survey vessels, with HRG survey equipment operating below 200 kHz, from January through April within the lease area or export cable corridor, not including coastal and bay waters. Additionally, the monitoring team will consult NMFS's North Atlantic right whale reporting systems for any observed right whales throughout survey operations within or adjacent to SMAs and/or DMAs, and will comply with 10 knot speed restrictions in any DMA, as noted above.

Crew Training

Prior to initiation of survey work, all crew members will undergo environmental training, a component of which will focus on the procedures for sighting and protection of marine mammals.

Based on our evaluation of the applicant's proposed measures, NMFS has preliminarily determined that the proposed mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such

taking. The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas).
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors.
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks.
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat).
- Mitigation and monitoring effectiveness.

Proposed Monitoring Measures

As described above, visual monitoring would be performed by qualified and NMFS-approved PSOs, the resumes of whom will be provided to NMFS for review and approval prior to the start of survey activities. Vineyard Wind 1 would employ independent, dedicated, trained PSOs, meaning that the PSOs must (1) be employed by a third-party observer provider, (2) have no tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of marine mammals and mitigation requirements (including brief alerts regarding maritime hazards), and (3) have successfully completed an approved PSO training course appropriate for their designated task.

The PSOs will be responsible for monitoring the waters surrounding each survey vessel to the farthest extent permitted by sighting conditions, including exclusion zones, during all HRG survey operations. PSOs will visually monitor and identify marine mammals, including those approaching or entering the established exclusion zones during survey activities. It will be the responsibility of the Lead PSO on duty to communicate the presence of marine mammals as well as to communicate the action(s) that are necessary to ensure mitigation and monitoring requirements are implemented as appropriate.

During all HRG survey operations (*e.g.*, any day on which use of an HRG source is planned to occur), a minimum of one PSO must be on duty and conducting visual observations at all times on all active survey vessels when HRG equipment operating at or below 200 kHz is operating, including both daytime and nighttime operations. Visual monitoring would begin no less than 60 minutes prior to initiation of HRG survey equipment and would continue until 30 minutes after use of the acoustic source ceases. Vineyard Wind 1 states that a requirement to employ at least 2 PSOs during all nighttime survey operations is impracticable, given the limited available berths on the survey vessels and additional personnel required to conduct PAM.

Observations would take place from the highest available vantage point on the survey vessel. In cases where more than one PSO is on duty at a time PSOs would coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts. PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least two hours between watches and may conduct a maximum of 12 hours of observation per 24-hour period. In cases where multiple vessels are surveying concurrently, any observations of marine mammals would be communicated to PSOs on all survey vessels.

PSOs must be equipped with binoculars and have the ability to estimate distance and bearing to detect marine mammals, particularly in proximity to exclusion zones. Reticulated binoculars will also be available to PSOs for use as appropriate based on conditions and visibility to support the monitoring of marine mammals. PSOs must use night-vision technology during nighttime surveys when the sources are active. Position data would be recorded using hand-held or vessel GPS units for each sighting.

During good conditions (*e.g.*, daylight hours; Beaufort sea state (BSS) 3 or less), to the maximum extent practicable, PSOs would conduct observations when the acoustic source is not operating for comparison of sighting rates and behavior with and without use of the acoustic source. Any observations of marine mammals by crew members aboard any vessel associated with the survey would be relayed to the PSO team. Data on all PSO observations would be recorded based on standard PSO collection requirements. This would include dates, times, and locations of survey operations; dates and times of observations, location and weather; details of marine mammal sightings (*e.g.*, species, numbers, behavior); and details of any observed marine mammal take that occurs (*e.g.*, noted behavioral disturbances).

Proposed Reporting Measures

Within 90 days after completion of survey activities, a final technical report will be provided to NMFS that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring, summarizes the number of marine mammals estimated to have been taken during survey activities (by species, when known), summarizes the mitigation actions taken during surveys (including what type of mitigation and the species and number of animals that prompted the mitigation action, when known), and provides an interpretation of the results and effectiveness of all mitigation and monitoring measures. Any recommendations made by NMFS must be addressed in the final report prior to acceptance by NMFS. PSO datasheets or raw sightings data must also be provided with the draft and final monitoring report. All draft and final monitoring reports must be submitted to *PR.ITP.MonitoringReports@noaa.gov* and *ITP.Davis@noaa.gov*.

The report must contain at minimum, the following:

- PSO names and affiliations;
- Dates of departures and returns to port with port name;
- Dates and times (Greenwich Mean Time) of survey effort and times corresponding with PSO effort;
- Vessel location (latitude/longitude) when survey effort begins and ends; vessel location at beginning and end of visual PSO duty shifts;
- Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any line change;
- Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions change significantly), including wind speed and direction, Beaufort sea state, Beaufort wind force, swell height, weather conditions, cloud cover, sun glare, and overall visibility to the horizon;

- Factors that may be contributing to impaired observations during each PSO shift change or as needed as environmental conditions change (*e.g.*, vessel traffic, equipment malfunctions); and
- Survey activity information, such as type of survey equipment in operation, acoustic source power output while in operation, and any other notes of significance (*i.e.*, pre-clearance survey, ramp-up, shutdown, end of operations, *etc.*)

If a marine mammal is sighted, the following information should be recorded:

- Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
- PSO who sighted the animal;
- Time of sighting;
- Vessel location at time of sighting;
- Water depth;
- Direction of vessel's travel (compass direction);
- Direction of animal's travel relative to the vessel;
- Pace of the animal;
- Estimated distance to the animal and its heading relative to vessel at initial sighting;
- Identification of the animal (*e.g.*, genus/species, lowest possible taxonomic level, or unidentified); also note the composition of the group if there is a mix of species;
- Estimated number of animals (high/low/best);
- Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, *etc.*);

- Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics);
- Detailed behavior observations (*e.g.*, number of blows, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior);
- Animal's closest point of approach and/or closest distance from the center point of the acoustic source; and
- Description of any actions implemented in response to the sighting (*e.g.*, delays, shutdown, ramp-up, speed or course alteration, etc.) and time and location of the action.

If a North Atlantic right whale is observed at any time by PSOs or personnel on any project vessels, during surveys or during vessel transit, Vineyard Wind 1 must immediately report sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System: (866) 755-6622. North Atlantic right whale sightings in any location may also be reported to the U.S. Coast Guard via channel 16.

In the event that personnel involved in the survey activities covered by the authorization discover an injured or dead marine mammal, Vineyard Wind 1 must report the incident to the NMFS Office of Protected Resources (OPR) and the NMFS New England/Mid-Atlantic Stranding Coordinator as soon as feasible. The report must include the following information:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);

- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

In the event of a vessel strike of a marine mammal by any vessel involved in the activities covered by the authorization, Vineyard Wind 1 must report the incident to the NMFS OPR and the NMFS New England/Mid-Atlantic Stranding Coordinator as soon as feasible. The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Species identification (if known) or description of the animal(s) involved;
- Vessel's speed during and leading up to the incident;
- Vessel's course/heading and what operations were being conducted (if applicable);
- Status of all sound sources in use;
- Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;
- Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;
- Estimated size and length of animal that was struck;
- Description of the behavior of the marine mammal immediately preceding and following the strike;
- If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
- Estimated fate of the animal (*e.g.*, dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and
- To the extent practicable, photographs or video footage of the animal(s).

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, our analysis applies to all the species listed in Table 2, given that NMFS expects the anticipated effects of the proposed survey to be similar in nature. Where there are meaningful differences between species or stocks—as is the case of the North Atlantic right whale—they are included as separate subsections below. NMFS does not anticipate that serious injury or mortality would occur as a result from HRG surveys, even in the absence of mitigation, and no serious injury or mortality is proposed to be authorized. As discussed in the **Potential Effects of Specified Activity on Marine Mammals and Their Habitat** section, non-auditory physical effects and vessel strike are not expected to occur. NMFS expects that all potential takes would be in the form of

short-term Level B behavioral harassment in the form of temporary avoidance of the area or decreased foraging (if such activity was occurring), reactions that are considered to be of low severity and with no lasting biological consequences (*e.g.*, Southall *et al*., 2007). Even repeated Level B harassment of some small subset of an overall stock is unlikely to result in any significant realized decrease in viability for the affected individuals, and thus would not result in any adverse impact to the stock as a whole. As described above, Level A harassment is not expected to occur given the nature of the operations, the estimated size of the Level A harassment zones, and the required shutdown zones for certain activities.

In addition to being temporary, the maximum expected harassment zone around a survey vessel is 178 m. Although this distance is assumed for all survey activity in estimating take numbers proposed for authorization and evaluated here, in reality much of the survey activity would involve use of acoustic sources with smaller acoustic harassment zones, producing expected effects of particularly low severity. Therefore, the ensonified area surrounding each vessel is relatively small compared to the overall distribution of the animals in the area and their use of the habitat. Feeding behavior is not likely to be significantly impacted as prey species are mobile and are broadly distributed throughout the survey area; therefore, marine mammals that may be temporarily displaced during survey activities are expected to be able to resume foraging once they have moved away from areas with disturbing levels of underwater noise. Because of the temporary nature of the disturbance and the availability of similar habitat and resources in the surrounding area, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations.

There are no rookeries, mating or calving grounds known to be biologically important to marine mammals within the proposed survey area. (Biologically important

areas for feeding and migration are discussed below.) There is no designated critical habitat for any ESA-listed marine mammals in the proposed survey area.

North Atlantic Right Whales

The status of the North Atlantic right whale population is of heightened concern and, therefore, merits additional analysis. As noted previously, elevated North Atlantic right whale mortalities began in June 2017 and there is an active UME. Overall, preliminary findings support human interactions, specifically vessel strikes and entanglements, as the cause of death for the majority of right whales.

As noted previously, the proposed project area overlaps a migratory corridor BIA for North Atlantic right whales (March-April and November-December). In addition to the migratory BIA, Oleson *et al.* (2020) identified an area south of Martha's Vineyard and Nantucket, referred to as "South of the Islands," as a newer, year-round, core North Atlantic right whale foraging habitat. The South of the Islands area overlaps with most of Vineyard Wind 1's project area.

As stated previously, the largest Level B harassment isopleth for Vineyard Wind 1's survey is 178 m. Therefore, even if Vineyard Wind 1 operates multiple survey vessels concurrently in this area, the total area ensonified above the Level B harassment threshold would be minimal in comparison with the remaining South of the Islands feeding habitat, and habitat within the migratory corridor BIA available to North Atlantic right whales. Additionally, NMFS is also requiring Vineyard Wind 1 to limit the number of survey vessels operating concurrently in the lease area or export cable corridor (not including coastal and bay waters) to no more than three from January through April, when North Atlantic right whale densities are the highest. Given the factors discussed above, and the temporary nature of the surveys, right whale migration is not expected to be impacted by the proposed survey, and feeding is not expected to be affected a degree

that would affect North Atlantic right whale foraging success in the South of the Islands important feeding area.

No ship strike is expected to occur during Vineyard Wind 1's proposed activities, and required vessel strike avoidance measures will decrease risk of ship strike, including during migration and feeding. HRG survey operations are required to maintain a 500 m EZ and shutdown if a North Atlantic right whale is sighted at or within the EZ. Regarding take by Level B harassment, the 500 m shutdown zone for right whales is conservative, considering the Level B harassment isopleth for the most impactful acoustic source (*i.e.*, boomer) is estimated to be 178 m. Therefore, this EZ minimizes the potential for behavioral harassment of this species. Additionally, as noted previously, Level A harassment take is not expected for any species, including North Atlantic right whales, given the small PTS zones associated with HRG equipment types proposed for use.

The Level B harassment takes of North Atlantic right whale proposed for authorization are not expected to exacerbate or compound upon the ongoing UME. The limited North Atlantic right whale Level B harassment takes proposed for authorization are expected to be of a short duration, and given the number of estimated takes, repeated exposures of the same individual are not expected. Therefore, the takes would not be expected to impact individual fitness or annual rates of recruitment or survival. Further, given the relatively small size of the ensonified area during surveys, it is unlikely that North Atlantic right whale prey availability would be adversely affected by HRG survey operations.

Biologically Important Area for Fin Whales

The proposed project area overlaps with a feeding BIA for fin whales (March-October). The fin whale feeding BIA is large (2,933 km^2), and the acoustic footprint of the proposed survey is sufficiently small such that feeding opportunities for these whales would not be reduced appreciably. Any fin whales temporarily displaced from the

proposed survey area would be expected to have sufficient remaining feeding habitat available to them, and would not be prevented from feeding in other areas within the biologically important feeding habitat. In addition, any displacement of fin whales from the BIA or interruption of foraging bouts would be expected to be temporary in nature. Therefore, we do not expect fin whales feeding within the feeding BIAs to be impacted by the proposed survey to an extent that would affect fitness or reproduction.

Other Marine Mammal Species with Active UMEs

As noted previously, there are several active UMEs occurring in the vicinity of Vineyard Wind 1's proposed survey area. Elevated humpback whale mortalities have occurred along the Atlantic coast from Maine through Florida since January 2016. Of the cases examined, approximately half had evidence of human interaction (ship strike or entanglement). Despite the UME, the relevant population of humpback whales (the West Indies breeding population, or DPS) remains stable at approximately 12,000 individuals, and the Level B harassment takes of humpback whale proposed for authorization are not expected to exacerbate or compound the ongoing UME.

Beginning in January 2017, elevated minke whale strandings have occurred along the Atlantic coast from Maine through South Carolina, with highest numbers in Massachusetts, Maine, and New York. The likely population abundance is greater than 20,000 whales, and the Level B harassment takes of minke whale proposed for authorization are not expected to exacerbate or compound upon the ongoing UME.

Elevated numbers of harbor seal and gray seal mortalities were first observed in July 2018 and have occurred across Maine, New Hampshire, and Massachusetts. Based on tests conducted so far, the main pathogen found in the seals is phocine distemper virus, although additional testing to identify other factors that may be involved in this UME are underway. The Level B harassment takes of harbor seal and gray seal proposed for authorization are not expected to exacerbate or compound upon the ongoing UME.

For harbor seals, the population abundance is over 75,000 and annual M/SI (350) is well below PBR (2,006) (Hayes *et al*., 2020). The population abundance for gray seals in the United States is over 27,000, with an estimated abundance, including seals in Canada, of approximately 450,000. In addition, the abundance of gray seals is likely increasing in the U.S. Atlantic as well as in Canada (Hayes *et al.*, 2020).

The required mitigation measures are expected to reduce the number and/or severity of proposed takes for all species listed in Table 2, including those with active UMEs, to the level of least practicable adverse impact. In particular they would provide animals the opportunity to move away from the sound source throughout the survey area before HRG survey equipment reaches full energy, thus preventing them from being exposed to sound levels that have the potential to cause injury (Level A harassment) or more severe Level B harassment. No Level A harassment is anticipated, even in the absence of mitigation measures, or proposed for authorization.

NMFS expects that takes would be in the form of short-term Level B behavioral harassment by way of brief startling reactions and/or temporary vacating of the area, or decreased foraging (if such activity was occurring)—reactions that (at the scale and intensity anticipated here) are considered to be of low severity, with no lasting biological consequences. Since both the sources and marine mammals are mobile, animals would only be exposed briefly to a small ensonified area that might result in take. Additionally, required mitigation measures would further reduce exposure to sound that could result in more severe behavioral harassment.

In summary and as described above, the following factors primarily support our preliminary determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No mortality or serious injury is anticipated or proposed for authorization;

- No Level A harassment (PTS) is anticipated, even in the absence of mitigation measures, or proposed for authorization;
- Foraging success is not likely to be significantly impacted as effects on species that serve as prey species for marine mammals from the survey are expected to be minimal;
- The availability of alternate areas of similar habitat value for marine mammals to temporarily vacate the survey area during the planned survey to avoid exposure to sounds from the activity;
- Take is anticipated to be primarily Level B behavioral harassment consisting of brief startling reactions and/or temporary avoidance of the survey area;
- While the survey area overlaps areas noted as a migratory BIA for North Atlantic right whales, the activities would occur in such a comparatively small area such that any avoidance of the survey area due to activities would not affect migration. In addition, mitigation measures to shutdown at 500 m to minimize potential for Level B behavioral harassment would limit any take of the species;
- Similarly, due to the relatively small footprint of the survey activities in relation to the size of the fin whale feeding BIA and South of the Islands North Atlantic right whale feeding area, the survey activities would not affect foraging success of these species; and
- The proposed mitigation measures, including visual monitoring and shutdowns, are expected to minimize potential impacts to marine mammals.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from Vineyard Wind 1's proposed

HRG survey activities will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is fewer than one third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

Take of all species or stocks is below one third of the estimated stock abundance (in fact, take of individuals is less than 3 percent of the abundance for all affected stocks) as shown in Table 4. Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species, in this case with NMFS Greater Atlantic Regional Fisheries Office (GARFO).

NMFS Office of Protected Resources (OPR) is proposing to authorize take of fin whale, North Atlantic right whale, sei whale, and sperm whale, which are listed under the ESA. OPR will consult with GARFO for the issuance of this IHA. NMFS will conclude the ESA consultation prior to reaching a determination regarding the proposed issuance of the authorization.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to Vineyard Wind 1 for conducting marine site characterization surveys off of Massachusetts and Rhode Island for one year from the date of issuance, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. A draft of the proposed IHA can be found at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable*.

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this notice of proposed IHA for the proposed marine site characterization surveys. We also request at this time comment on the potential Renewal of this proposed IHA as described in the paragraph below. Please include with your comments any

supporting data or literature citations to help inform decisions on the request for this IHA or a subsequent Renewal IHA.

On a case-by-case basis, NMFS may issue a one-time, one-year Renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical or nearly identical, or nearly identical, activities as described in the **Description of Proposed Activities** section of this notice is planned or (2) the activities as described in the **Description of Proposed Activities** section of this notice would not be completed by the time the IHA expires and a Renewal would allow for completion of the activities beyond that described in the *Dates and Duration* section of this notice, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to the needed Renewal IHA effective date (recognizing that the Renewal IHA expiration date cannot extend beyond one year from expiration of the initial IHA);
- The request for renewal must include the following:

(1) An explanation that the activities to be conducted under the requested Renewal IHA are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor (*e.g.*, reduction in pile size) that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take); and

(2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.

Upon review of the request for Renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings in the initial IHA remain valid.

Dated: June 1, 2021.

Catherine Marzin,

Acting Director, Office of Protected Resources,

National Marine Fisheries Service.

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